Air Quality in Alberta
April to June, 2001

Alberta Environment continuously monitors air quality in Edmonton (three stations), Calgary (three stations), Red Deer, Fort Saskatchewan and Beaverlodge (35 km west-northwest of Grande Prairie). Air quality parameters monitored at Alberta Environment stations include carbon monoxide, dust and smoke, oxides of nitrogen, ozone, total hydrocarbons, hydrogen sulphide, sulphur dioxide, ammonia and particulates (PM_{10} and $PM_{2.5}$). The Index of the Quality of the Air (IQUA) is calculated at the Edmonton, Calgary, Red Deer and Fort Saskatchewan stations. The IQUA converts air parameter concentrations into ***Good***, ***Fair***, ***Poor*** and ***Very Poor*** air quality ratings.

Highlights

+ **Air quality was rated as *Good* from 88 to 99 per cent of the time at Alberta monitoring stations from April to June 2001.** ***Good*** air quality is the best possible rating and means that there are no known harmful effects to human or environmental health. Air quality was rated as ***Fair*** the remainder of the time at all monitoring stations. ***Fair*** air quality means that there is adequate protection against harmful effects.

+ ***Poor* and *Very Poor* air quality did not occur from April to June 2001.** ***Poor*** and ***Very Poor*** air quality is rare in Alberta. In the last five years (1996 to 2000), there has been only one occurrence of ***Poor*** air quality at Edmonton and Calgary monitoring stations in April, May or June. ***Very Poor*** air quality has not occurred during these months over the past ten years at Alberta monitoring stations.

+ **High particulate concentrations, caused by forest fire smoke, were measured in Edmonton and Red Deer on May 24.** This smoke was from a forest fire near Chisholm, Alberta (located 150 km north-northwest of Edmonton). Smoke from the Chisholm fire was transported into Edmonton from noon to 3 p.m. and Red Deer from 6 to 10 p.m. on May 24. Fine particulate ($PM_{2.5}$) concentrations exceeded the Canada-wide Standard benchmark, of

For current air quality conditions call ***427-7273*** in Edmonton and ***250-2099*** in Calgary.

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30 micrograms per cubic metre ($\mu g/m^3$) for a 24-hour time period, in both Edmonton and Red Deer on May 24. Daily average $PM_{2.5}$ levels ranged from 33 $\mu g/m^3$ in Red Deer to 55 $\mu g/m^3$ in northwest Edmonton. Peak one-hour $PM_{2.5}$ concentrations in Edmonton were as high as 276 $\mu g/m^3$. This forest fire smoke event prompted Capital Health to issue an air quality advisory for the Edmonton area. During this event, persons with respiratory conditions were advised to limit their physical activity and take preventive measures as recommended by their physicians.

+ **Air quality guidelines for all other parameters were not exceeded during the second quarter of 2001**. Alberta has ambient air quality guidelines for parameters including carbon monoxide, dust and smoke, nitrogen dioxide, ozone, hydrogen sulphide and ammonia.

+ **Concentrations of pollutants emitted by automobiles continued to show a downward trend in the second quarter of 2001.** Carbon monoxide levels in Edmonton and Calgary were from 19 to 38 per cent lower than the average for the last ten years (1991 to 2000) in the second quarter of 2001. Nitrogen dioxide concentrations were also lower than the ten-year average at all Calgary stations with average levels in April to June 2001 from 15 to 20 per cent lower than the ten-year average. Average dust and smoke levels were from 30 to 49 per cent lower than the ten-year average at Edmonton stations. However, at Calgary stations, dust and smoke levels in the second quarter of 2001 were from 8 to 21 per cent higher than the ten-year average. Higher dust and smoke levels in Calgary may have been due to the combination of higher traffic volumes and dry weather conditions. Lower levels of other pollutants at urban monitoring stations are primarily due to improvements in emission control systems on newer vehicles.

Number of Times Air Quality Guidelines were Exceeded - April to June, 2001

Station	Carbon Monoxide		Dust and Smoke	Hydrogen Sulphide		Nitrogen Dioxide		Ozone	Particulate	Sulphur Dioxide		Ammonia
	1-hour	8-hour	monthly	1-hour	24-hour	1-hour	24-hour	1-hour	24-hour $PM_{2.5}$	1-hour	24-hour	1-hour
Edmonton Central	0	0	0	na	na	0	0	0	1	na	na	na
Edmonton Northwest	0	0	0	na	na	0	0	0	1	na	na	na
Edmonton East	0	0	0	0	0	0	0	0	1	0	0	na
Calgary Central	0	0	0	na	na	0	0	0	0	na	na	na
Calgary Northwest	0	0	0	na	na	0	0	0	na	na	na	na
Calgary East	0	0	0	0	0	0	0	0	na	0	0	na
Red Deer	0	0	na	0	0	0	0	0	1	0	0	na
Fort Saskatchewan	0	0	0	0	0	0	0	0	na	0	0	0
Beaverlodge	na	na	na	na	na	0	0	0	na	0	0	na
Guideline	13 ppm	5 ppm	90% of values< 1 COH unit	0.01 ppm	0.003 ppm	0.212 ppm	0.106 ppm	0.082 ppm	30 µg/m3 *	0.172 ppm	0.057 ppm	2.0 ppm

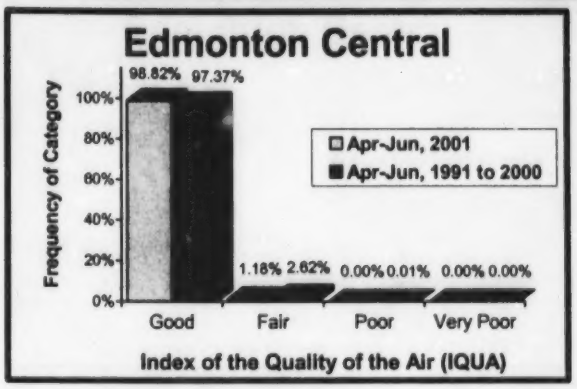
na Parameter not monitored at this location.

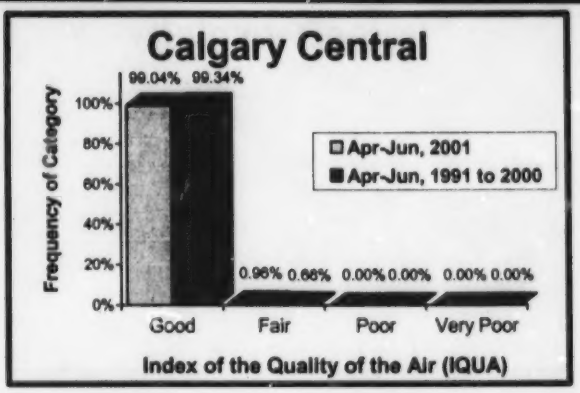
* The level and form of the achievement statistic specified the $PM_{2.5}$ Canada-wide Standard is 30 $\mu g/m^3$, for 24-hour averaging time, based on the 98th percentile annual value, averaged over three consecutive years. (Canadian Council of Ministers of the Environment. 2001. Guidance Document on Achievement Determination: Canada-wide Standards for Particulate Matter (PM) and Ozone.)

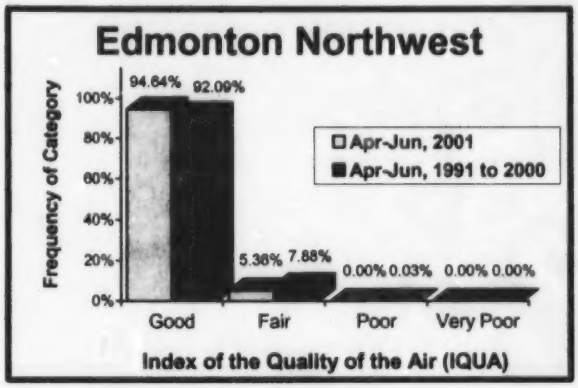
The Index of the Quality of the Air

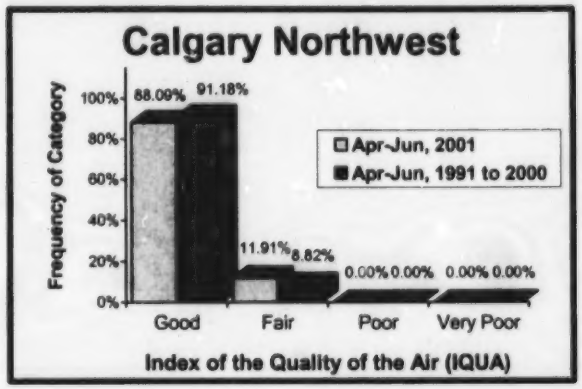
The index of the quality of the air (IQUA) provides the public with a meaningful measure of outdoor air quality. The IQUA is calculated every hour at all Edmonton, Calgary, Red Deer and Fort Saskatchewan monitoring stations. From this index, we can effectively rate air quality as Good, Fair, Poor or Very Poor. Air pollutants used to calculate the IQUA are carbon monoxide, dust and smoke, nitrogen dioxide, ozone and sulphur dioxide. Good, Fair, Poor and Very Poor air quality categories are directly related to guidelines under Alberta's *Environmental Protection and Enhancement Act*, and National Ambient Air Quality Objectives.

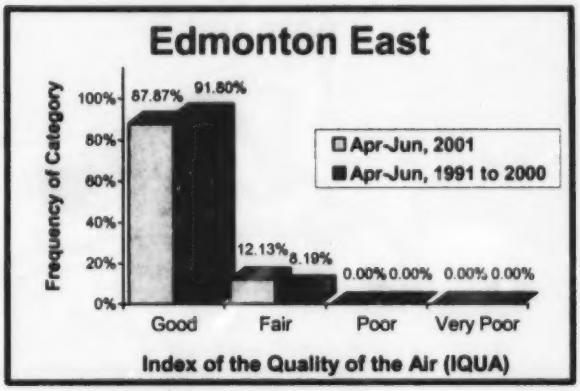
IQUA rating	Description
Good	Desirable range: no known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
Fair	Acceptable range: adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
Poor	Tolerable range: not all aspects of the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
Very Poor	Intolerable range: in this range, continued high readings could pose a risk to public health.

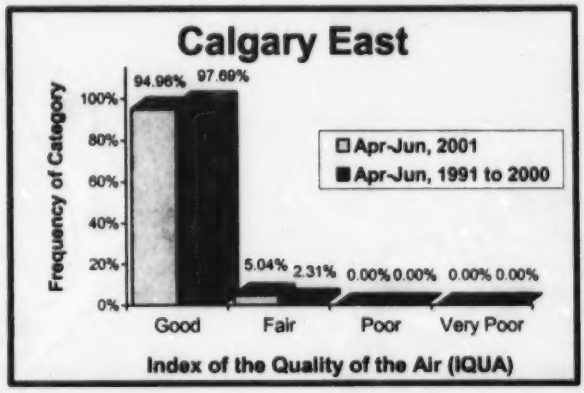


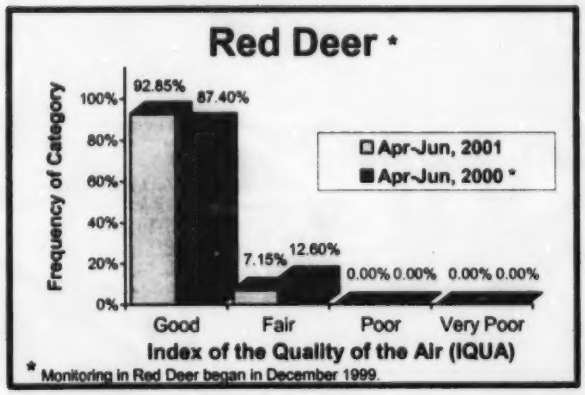




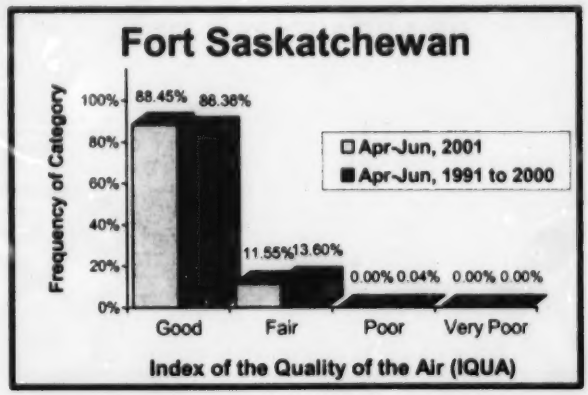








* Monitoring in Red Deer began in December 1999.



Average Concentrations - April to June, 2001 [a]

Parameter	Monitoring Period	Edmonton Stations			Calgary Stations			Red Deer [b]	Fort Saskatchewan	Beaverlodge [c]
		Central	Northwest	East	Central	Northwest	East			
Carbon Monoxide	Apr-Jun 2001	0.46	0.49	0.28	0.48	0.30	0.47	0.26	0.27	na
(ppm)	Apr-Jun 1991-2000	0.73	0.61	0.36	0.76	0.46	0.61	0.21	0.34	na
Dust and Smoke	Apr-Jun 2001	0.07	0.09	0.09	0.17	0.08	0.20	na	0.05	na
(COH unit)	Apr-Jun 1991-2000	0.14	0.14	0.12	0.16	0.07	0.17	na	0.07	na
Hydrogen Sulphide	Apr-Jun 2001	na	na	0.000	na	na	0.001	0.000	0.000	na
(ppm)	Apr-Jun 1991-2000 [b]	na	na	0.001	na	na	0.001	0.000	0.000	na
Nitrogen Dioxide	Apr-Jun 2001	0.021	0.016	0.013	0.022	0.010	0.018	0.008	0.008	0.002
(ppm)	Apr-Jun 1991-2000	0.021	0.018	0.013	0.026	0.012	0.022	0.008	0.009	0.002
Ozone	Apr-Jun 2001	0.025	0.029	0.034	0.024	0.034	0.028	0.031	0.033	0.039
(ppm)	Apr-Jun 1991-2000	0.024	0.027	0.031	0.021	0.031	0.024	0.032	0.033	0.036
Sulphur Dioxide	Apr-Jun 2001	na	na	0.002	na	na	0.002	0.000	0.001	0.000
(ppm)	Apr-Jun 1991-2000 [d]	na	na	0.002	na	na	0.002	0.001	0.001	0.000
Total Hydrocarbons	Apr-Jun 2001	2.11	2.07	2.19	1.99	2.01	2.01	2.08	1.81	na
(ppm)	Apr-Jun 1991-2000	2.05	1.90	2.20	2.03	1.91	2.01	1.82	1.83	na
Particulate	Apr-Jun 2001	na	23.7	na	20.9	na	na	na	na	na
(PM_{10} in $\mu g/m^3$)	Apr-Jun 1994-97 [e]	na	23.7	25.5	25.2	na	na	18.0	na	na
Particulate	Apr-Jun 2001	7.7	9.9	9.5	8.8	na	na	8.1	na	na
($PM_{2.5}$ in $\mu g/m^3$)	Apr-Jun 1998 [f,g]	na	11.6	na	9.8	na	na	na	na	na
Ammonia	Apr-Jun 2001	na	na	na	na	na	na	na	0.003	na
(ppm)	Apr-Jun 1991-2000	na	na	na	na	na	na	na	0.004	na

Maximum One-Hour Concentrations - April to June, 2001 [a]

Parameter	Edmonton Stations			Calgary Stations			Red Deer	Fort Saskatchewan	Beaverlodge	One-Hour Guideline
	Central	Northwest	East	Central	Northwest	East				
Carbon Monoxide (ppm)	2.2	3.8	1.5	1.9	1.7	3.3	1.5	2.5	na	**13.0**
Dust and Smoke (COH Unit)	2.3	2.7	2.6	1.0	0.6	1.7	na	1.2	na	**na**
Hydrogen Sulphide (ppm)	na	na	0.006	na	na	0.010	0.004	0.002	na	**0.010**
Nitrogen Dioxide (ppm)	0.059	0.065	0.052	0.150	0.053	0.060	0.039	0.048	0.015	**0.212**
Ozone (ppm)	0.062	0.070	0.073	0.061	0.073	0.068	0.065	0.066	0.068	**0.082**
Sulphur Dioxide (ppm)	na	na	0.061	na	na	0.016	0.005	0.021	0.010	**0.172**
Total Hydrocarbons (ppm)	3.1	4.6	10.0	2.7	3.3	2.9	4.4	2.9	na	**na**
Particulate (PM_{10} in $\mu g/m^3$)	na	304	na	187	na	na	na	na	na	**na**
Particulate ($PM_{2.5}$ in $\mu g/m^3$)	275	261	276	60	na	na	162	na	na	**na**
Ammonia (ppm)	na	na	na	na	na	na	na	0.041	na	**2.0**

a All average and maximum values based on data collected from April to June

b Hydrogen sulphide monitoring began in February 1991 at the Edmonton East station

c Monitoring at the Beaverlodge station began in November 1997

d Sulphur dioxide monitoring began in February 1999 at the Beaverlodge station

e PM_{10} monitoring began in January 1996 at the Calgary Central station and November 1993 at the Edmonton Northwest station

f The PM_{10} monitor at the Edmonton East station was converted to $PM_{2.5}$ in August 2000. The PM_{10} monitor at the Red Deer station was converted to $PM_{2.5}$ in December 2000

g $PM_{2.5}$ monitoring began in November 1997 at the Calgary Central station, July 1998 at the Edmonton Northwest station and October 2000 at the Edmonton Central station

h Monitoring at the Red Deer station began in December 1999

na Parameter not monitored at this location or no one-hour guideline for parameter